

CLAIMS

What is claimed is:

1. A method of determining a network topology induced by network address translation,
5 comprising:
initiating communications, from a server behind a translating device, which
effect the network address translation; and
monitoring the communications beyond the translating device to infer
partitioning of servers into equivalence sets relative to the network topology induced by
10 the network address translation.
2. The method according to Claim 1 wherein the communications include at least one
source address in a message.
3. The method according to Claim 2 wherein the source address includes an IP address.
4. The method according to Claim 2 wherein a unique identification number is included in
15 the message.
5. The method according to Claim 1 wherein monitoring includes distinguishing between
communications affected by and not affected by network address translation.
6. The method according to Claim 5 wherein distinguishing includes comparing an
apparent source address of a message against an actual source address provided in the
20 message.
7. The method according to Claim 1 further comprising assessing a range of network
addresses behind the translating device.

8. The method according to Claim 1 further comprising assessing a range of public network addresses associated with the translating device.
9. The method according to Claim 1 further comprising distinguishing between active and passive clients.
- 5 10. The method according to Claim 9 further including directing a message from a passive client to an active client.
- 10 11. The method according to Claim 9 further including, from a processor beyond the translating device, causing a message to a passive client to be redirected to an active client, the active client responsively communicating with the processor beyond the translating device.
12. The method according to Claim 1 wherein monitoring includes maintaining at least one translated address set.
13. The method according to Claim 12 wherein monitoring further includes comparing apparent message source addresses with addresses in the translated address set.
- 15 14. The method according to Claim 13 further including merging translated address sets in response to determining that multiple apparent source addresses in distinct translated address sets correspond to the same actual source address.
15. The method according to Claim 13 further including assessing whether the source address is behind a known address translation device.
- 20 16. The method according to Claim 12 wherein maintaining includes providing a timeout mechanism for removing an address from a translated address set.

17. The method according to Claim 1 further including commanding a new client to contact a known client behind the same network address translation device.
18. The method according to Claim 1 wherein monitoring includes providing a soft-state mechanism to occasionally refresh partitioning.
- 5 19. Apparatus to be located beyond a network address translation device for determining a topology of a network in the presence of network address translation, comprising:
 - a processor coupled to a network interface for receiving communication from a network device effecting network address translation; and
 - 10 a processor routine operating on the processor, the processor routine to infer partitioning of servers into equivalence sets relative to the network topology induced by the network address translation.
20. The apparatus according to Claim 19 wherein the messages received include at least one source address in the message.
21. The apparatus according to Claim 20 wherein the processor routine compares an apparent
15 source address of a message against an actual source address provided in the message.
22. The apparatus according to Claim 20 further including at least one translated address set, the source address being stored in the translated address set.
23. The apparatus according to Claim 19 wherein the processor is further coupled to
20 memory, the processor routine storing a database of translated address sets in the memory.

24. The apparatus according to Claim 23 wherein the processor routine includes a database manager to compare apparent message source addresses with addresses stored in the database of translated address sets.

5 25. The apparatus according to Claim 24 wherein the database manager provides a timeout mechanism for removing translated addresses from the translated address sets in the database.

26. Apparatus to be located behind a network address translation device for providing communications used to determine a topology of a network in the presence of network address translation, comprising:

10 a processor coupled to a network interface, the processor initiating communications to a server beyond a translation device to effect network address translation; and

a processor routine operating on said processor, said processor routine providing the actual network address of the processor in a message of the communications.

15 27. The apparatus according to Claim 26 wherein said processor issues communications in response to receiving a communication from behind the network address translation device.

28. A computer program product comprising:

20 a computer usable medium for storing data; and

a set of computer program instructions embodied on the computer usable medium, including instructions to:

receive communications from a network device effecting network address translation; and

25 infer partitioning of servers into equivalence sets relative to the network topology induced by the network address translation.

29. Apparatus for determining a topology of a network in the presence of network address translation, comprising:
- means for initiating communications from a network which effects network address translation; and
- 5 means for monitoring the communication to infer partitioning of servers into equivalence sets relative to the network topology induced by the network address translation.
30. In a network device beyond a network address translation device, a method for determining a topology of a network in the presence of network address translation, the method comprising:
- 10 receiving communication messages from a network device effecting network address translation; and
- inferring partitioning of servers into equivalence sets relative to the network topology induced by the network address translation.
31. The method according to Claim 30 wherein the messages received include at least one source address in the message.
32. The method according to Claim 31 further including comparing an apparent source address of a message against an actual source address provided in the message.
33. The method according to Claim 31 further including maintaining at least one translated address set, the source address being stored in the translated address set.
- 20 34. The method according to Claim 30 further including storing a database of translated address sets.

35. The method according to Claim 34 further including comparing apparent message source addresses with addresses stored in the database of translated address sets.
36. The method according to Claim 35 further including removing translated addresses from the translated address sets in the database after exceeding a timeout duration.
- 5 37. In a network device located behind a network address translation device, a method for providing communications used to determine a topology of a network in the presence of network address translation, the method comprising:
- initiating communications to a server beyond a translation device to effect network address translation; and
- 10 providing the actual network address of the processor in a message of the communications.
38. The method according to Claim 37 further including issuing communications in response to receiving a communication from behind the network address translation device.